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DaimlerChrysler AG

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Vehicle seat

The invention relates to a vehicle seat according to the preamble of claim 1.

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In a known vehicle seat for a convertible or a roadster (DE 100 61 027 A1), an electric heating device and a blower are combined in a housing to form one component which is arranged underneath the horizontal net of a windbreak which is mounted in the vehicle and is composed of a horizontal and a vertical net. The air which is sucked in by the blower and is heated by the electric heating device is fed via a connecting hose to an air vent which is arranged between the upper side of the backrest and the underside of the head cushion of the headrest. The warm air is blown out of the air vent directly into the nape and head area of the seat user so that warm air is supplied to this area even when the vehicle is traveling at high speed. The air vent contains two sets of pivotable lamellas which are arranged one behind the other in the direction of air flow, the pivotable lamellas of one set being pivotable about a horizontal axis and the pivotable lamellas of the other set being pivotable about a vertical axis so that the direction of air outflow out of the air vent can be set.

In a vehicle seat which is also known for in particular open motor vehicles (DE 101 60 799 A1), the device for heating the nape and head area of the seat user has a warm air blower which is arranged at the rear side of the head cushion and whose pressure connector ends in the intermediate space between the head cushion of the

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headrest and the upper side of the backrest. The pressure connector has a venting opening whose normal extends directly onto the nape and head area of the seat user. Line connectors which end with a vertically
5 extending line section which has venting openings are connected to the side of the pressure connector. The line sections are connected to the line connector by means of a rotary bearing so that the venting direction of the warm air can be changed easily by rotating the
10 line sections, and can be set, for example, to the shoulder area of the seat user.

In a likewise known vehicle seat with an integrated headrest, in particular for a vehicle which is to be
15 driven in an open state (DE 196 54 370 C1, Figure 3), a blower and a heat exchanger via which the air which is sucked in by the blower is heated are arranged behind the rear wall of the passenger compartment. A plurality of nozzles whose nozzle stems which end at the rear of
20 the backrest are connected to an air line leading to the heat exchanger and blower are arranged spaced apart from one another in the horizontal direction in the nape area of the backrest. The air which is sucked in by the blower is heated in the heat exchanger and fed
25 via the air line to the nozzles where it is blown out into the nape and head area of the seat user.

The invention is based on the object of providing a vehicle seat of the type mentioned at the beginning
30 with a small-volume device which can be integrated satisfactorily and which has the purpose of heating the nape and head area of the seat user with warm air, which is efficient and which does not disrupt the esthetics of the vehicle seat and of the passenger
35 compartment.

The object is achieved according to the invention by means of the features of Claim 1.

The vehicle seat according to the invention has the advantage that all the necessary components for generating warm air are contained in the air vent which is located in the intermediate space between the backrest and head cushion of the headrest. Efficient conversion of energy is ensured by the direct electrical heating of the air which passes through the air vent. In order to apply warm air to the nape and head area of the seat user it is generally sufficient to provide just the electric heating unit, which is preferably embodied as an electric heating coil, in the air vent, since as a result of the back flow of air which is always present and which occurs to a greater degree when a vehicle is driven with an open passenger cell, a sufficient quantity of air always passes through the air vent and is heated by the heating unit. In addition, according to one advantageous embodiment of the invention it is possible to integrate a blower into the air vent, which blower is preferably embodied as a miniature fan. With this structural configuration of the air vent it is advantageously possible to use the known hairdryer technology.

In addition to the fact that the heating device which is reduced to the air vent is inconspicuously installed in the vehicle seat, additional air ducts in or behind the backrest and additional assemblies for the blower and heating unit in or behind the backrest are dispensed with. By eliminating additional components in the backrest the seating pressure comfort is improved and the upholstery of the backrest can be made simpler.

Advantageous embodiments of the vehicle seat according to the invention with expedient developments and refinements of the invention are given in the other patent claims.

According to advantageous embodiments of the invention, the air vent is arranged on the supporting bracket of the headrest or on the underside of the head cushion. This measure allows the heating device for the nape and head area of the seat user to be retrofitted, and permits the device to be provided as an accessory which is not specific to the vehicle or manufacturer. If the vehicle has a rollover bar which is assigned to the vehicle seat, the air vent can also be attached to the rollover bar as a retrofittable accessory.

According to one advantageous embodiment of the invention, the air vent is provided with a panel which covers the remaining intermediate space between the backrest and head cushion and preferably engages over both the rear of the backrest and the rear of the head cushion. As a result, cold air flows which pass by the air vent into the nape and head area of the seat user are screened off.

According to one advantageous embodiment of the invention, the air vent is designed so as to be pivotable about a vertical and/or horizontal pivot axis. This provides the possibility of varying the outflow direction of the warm air stream.

The air vent can be pivoted about three orthogonal axes if, according to one advantageous embodiment of the invention, the housing of the air vent is of spherical design and is accommodated in a displaceable fashion in two spatially secured spherical shells. The spherical shells can be attached to the supporting bracket or, when there is a backrest with an integrated headrest, they can be attached in the backrest itself.

The vehicle seat according to the invention may be a driver's seat, passenger's seat or a rear seat or rear bench seat. In the latter case, each seating place on

the rear bench seat is assigned a heating device for the nape and head area of a seat user occupying the seating place.

5 The invention is described in more detail below with reference to exemplary embodiments which are illustrated in the drawing. In said drawing, in each case in a schematic illustration:

10 Figure 1 shows a detail of a side view of a vehicle seat with a backrest, integrated headrest and a heating device (illustrated in section) for the nape and head area of a seat user,

15 Figure 2 shows a detail of a longitudinal section through the backrest in Figure 2 with a modified heating device,

20 Figure 3 shows a detail of a side view of a vehicle seat with a backrest and headrest as well as with a heating device which is attached to the headrest, for the nape and head area of a seat user according to a further exemplary embodiment,

25 Figure 4 shows a detail of a plan view in the direction of the arrow IV in Figure 3, and

30 Figure 5 shows a side view of a rear seat with the heating device.

The vehicle seat of which a detail is shown in a side view in Figure 1 has a backrest 11, a vertically adjustable headrest 12 and a device 13 for heating the
35 nape and head area of a seat user, located on the vehicle seat, with warm air. The backrest 11 is embodied as what is referred to as an integrated backrest in which a backrest extension 14 which is

embodied in one piece with the backrest 11 extends upward behind the headrest 12. The vertically adjustable headrest 12 has, in a known fashion, a supporting bracket 15 which is held in a vertically adjustable and lockable fashion in the backrest 11, and a head cushion 16 which is attached to the supporting bracket 15.

The heating device 13 comprises an air vent 17 with a housing 18 in which an air inlet opening 19 and, lying opposite in the axial direction, an air outlet opening 20 are formed, an electric heating unit 21 and a fan or a blower 22. The electric heating unit 21 and the blower 22 are integrated in the air vent 17. In the exemplary embodiment, the electric heating unit 21 is embodied as an electric heating coil 23, and the blower 22 is embodied as a miniature fan 24. Both are secured in the housing 18 of the air vent 17 in such a way that they lie one behind the other in the axial direction of the housing 18. In the exemplary embodiment illustrated in Figure 1, the heating coil 23 is arranged downstream of the miniature fan 24 in the direction of air flow, but the heating coil 23 can, as shown in Figure 2, also be arranged upstream of the miniature fan 24. Instead of the heating coil it is also possible to use a PCT heating element. The air vent 17 is inserted into the backrest extension 14 in such a way that it lies between the upper side of the backrest 11 and the underside of the head cushion 16 and points forward with its air outlet opening 20, toward the nape and head area of the seat user.

The heating device 13 which is illustrated in Figure 2 is modified in such a way that the housing 18 is of spherical design and is accommodated in a displaceable fashion between two spherical shells 25, 26 which are integrated in the backrest extension 14. As a result, the air vent 17 can be pivoted about three orthogonal

axes so that the normal of the air outlet opening 20 can be rotated in any desired direction. Miniature fans 24 and heating coils 23 are also arranged here in the housing 18 of the air vent 17, and only the sequence of
5 arrangement of the heating coil 23 and the miniature fan 24 in the air stream is interchanged compared to the air vent 17 in Figure 1.

In the case of the vehicle seat of which a detail is
10 illustrated in a side view in Figure 3, in which it is possible to see the backrest 11, headrest 12 and heating device 13, the air vent 17, in which the electric heating device 21 and the blower 22 are also integrated (Figure 4), is attached to the supporting
15 bracket 15 of the headrest 12. The supporting bracket 15 has two parallel bracket bars 151, 152 and a transverse part which connects the bracket bars 151, 152 and to which the head cushion 16 is attached. The bracket bars 151, 152 are vertically adjustable in the
20 backrest 11 in a known fashion and are held in a lockable fashion. To the side of the housing 18 of the air vent 17, two clips 27, 28 are provided and these each engage around a bracket bar 151 or 152 of the supporting bracket 15. If in each case a rotating joint
25 is provided between the clips 27, 28 and the housing 18, the air vent 17 can be pivoted about a pivot axis 29 (Figure 4) which extends parallel to the upper side of the backrest. If a ball joint is used, the air outlet opening 20 can be pivoted in any desired
30 direction.

A panel 30 is formed on to the housing 18 of the air vent 17 and said panel 30 covers the intermediate space between the two bracket bars 151, 152 of the headrest
35 12 which remains between the upper side of the backrest 11 and the underside of the head cushion 16 and is not covered by the air vent 17. The panel 30, which screens the nape and head area of the seat user against cold

air flows from behind, engages in each case over the rear side of the backrest 11 and head cushion 16 so that the intermediate space is covered at each setting of the headrest. Of course it is possible to embody the panel 30 also in such a way that it projects beyond the two bracket bars 151, 152 in the transverse direction of the vehicle seat. However, the width of the panel 30 which can be seen in Figure 4 has the advantage that the panel 30 does not impede the driver's view to the rear.

The air vent according to Figures 3 and 4 which can be retrofitted as a separate accessory can alternatively also be attached to the underside of the head cushion. Rubber bands or touch and close fasteners can be used to attach it. If the vehicle has a rollover bar which is assigned to the vehicle seat, said rollover bar can be used as a method of attachment for the air vent since it is arranged near to the backrest and also extends beyond the intermediate space between the upper edge of the backrest and the head cushion of the headrest.

Figure 5 is a schematically illustrated side view of a rear seat which has, like the driver's seat or front passenger's seat illustrated in Figures 1 and 3, a seat cushion 31, a backrest 11 and a headrest 12 as well as a heating device 13 for heating the nape and head area of a seat user with warm air. The seat cushion 31 is secured to the floor 27 of the vehicle and the backrest 11 is arranged on a rear wall 32 which bounds the passenger cell of the vehicle to the rear and which extends inclined with respect to the vertical at an acute angle and merges above the backrest 11 with an approximately horizontal cover 33, also referred to as a parcel shelf. While the backrest 11 is detachably attached to the rear wall 32, the headrest 12 is secured behind the rear wall 32 and underneath the

cover 33. The headrest 12 in turn has a head cushion 16 which is attached to a supporting bracket 15. As in the vehicle seats according to Figures 1 and 2, there is also an intermediate space between the upper side of the backrest 11 and the underside of the head cushion 16 in the case of the rear seat. Within this intermediate space, a cutout 34, into which the air vent 17 is inserted, is provided in the rear wall 32. The air vent 17 is embodied like the air vent 17 in Figure 1 or 2, that is to say it has a housing 18 with an integrated electric heating unit 21 and integrated blower 22. The air outlet opening 20 points forward into the nape and head area of the seat user, while the air inlet opening 19 lies outside the passenger cell, in the trunk behind the rear wall 32. Flat belts 35, 36 by means of which the air vent 17 is attached to the rear wall 32 extend from the housing 18. If the air vent 17 is embodied as shown in Figure 2, the two spherical shells which accommodate the housing 18 are secured in the rear wall 32.

The invention is not restricted to the described exemplary embodiment. For example, the blower 22 may be dispensed with in the heating device 13 and it is possible merely to arrange the electric heating unit 21 in the housing 18 of the air vent 17. This is sufficient in many cases since a back flow of the air is always present at the backrest 11, as a result of which a sufficiently large quantity of air flows through the air vent 17 and is heated by the heating unit 21. The effect of the backflow of air is also increased when the vehicle travels with an open passenger cell so that in this case a significantly larger warm air stream reaches the nape and head area of the seat user as desired.